

## The Janus Corner

Looking Back



Looking Forward

This occasional section within the journal surveys visions and achievements, often not on the main track of the developing biomedical sciences, but all relating to discoveries and developments of medicinals—both ancient and modern. What they have in common, in one way or another, is providing further background and glances around the edges of the core discipline of pharmacognosy, as it has been and continues to evolve within our times.

## Ginseng is Effective in the Treatment and Prevention of Influenza

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Influenza is a serious seasonal respiratory disease with an estimated 5-10% and 20-30% annual occurrence worldwide in adults and children respectively. Whilst the disease can be debilitating, in some cases it can result in severe illness which may lead to hospitalisation and even death. The WHO estimates 3-5 million severe cases worldwide, resulting in 250,000-500,000 deaths annually.<sup>1</sup> Vaccination is currently the most effective method of preventing influenza. Whilst antiviral drugs are available for the treatment of influenza, the virus can develop resistance to these drugs. Recent studies have reported that a *Panax ginseng* (ginseng) extract has beneficial preventative effects in the development of influenza.<sup>2</sup> Treatment of human lung epithelial cells with a ginseng extract improves cellular survival and reduces the expression of the pro-inflammatory cytokines IL-6 and IL-8, as well as stimulating production of the antiviral

cytokine IFN- $\gamma$ . The ginseng extract also inhibits the infiltration of inflammatory cells into the bronchial lumen, potentially providing further influenza preventative mechanisms. Furthermore, other studies by the same group have also reported that the same ginseng extract inhibits the growth of the virus once infection has occurred.<sup>3</sup> Thus, ginseng may be particularly useful due to its pluripotent mechanisms, both preventing the onset of influenza and treating it once the infection is established.

1. World Health Organisation. Influenza. <http://www.who.int/mediacentre/factsheets/fs211/en/> accessed 18 November, 2015.
2. Lee JS, Hwang HS, Ko EJ. Immunomodulatory activity of red ginseng against influenza A virus infection. *Nutrients*. 2014;6(2):517-29.
3. Yoo DG, Kim MC, Park MK. Protective effect of Korean red ginseng extract on the infections by H1N1 and H3N2 influenza viruses in mice. *Journal of Medicinal Food*. 2012;15(10):855-62.

# Mistletoe Inhibits Colon Cancer Cell Growth *in vitro*

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Colon cancer is the second greatest cause of cancer related mortality in developed countries. Recent research from an Adelaide University research group has reported that extracts prepared from several *Viscum* spp. (mistletoe) are effective inhibitors of colon cancer cell growth *in vitro*.<sup>1</sup> One extract known as Fraxini (produced from *Viscum* spp. growing on ash trees) was particularly effective. Indeed, the extract was a substantially more potent inhibitor of colon cancer cell proliferation than standard chemotherapy treatments. Furthermore, the Fraxini extract displayed significantly lower toxicity towards normal (non-cancer) intestinal cells than did the conventional anticancer chemotherapeutics. This is an important finding as further studies may result in the development of more effective treatment regimens without the negative side effects (oral mucositis, hair loss etc.) that are associated with most cancer chemotherapies. Of further note, whilst the Fraxini extract was a potent anti-proliferative agent on its own, when used as a combinational

therapy with other conventional therapeutics, it significantly increased the efficacy of these therapies, indicating possible synergism. Whilst this research is promising, it is currently only preliminary and it is noteworthy that of the 3 mistletoe extracts tested in this study, only one extract produced from a single *Viscum* spp. growing on a single tree type displayed both good inhibitory effects against cancer cells and low toxicity to normal cells. Multiple studies have reported high toxicity for *Viscum* spp.<sup>2</sup> and extreme caution is recommended. Indeed, mistletoe and its extracts should not be ingested or used medicinally in any way until studies further evaluate its safety/toxicity.

1. University of Adelaide. Could Mistletoe Give the Kiss of Death to Cancer? *Science Daily* 2012; <http://www.sciencedaily.com/releases/2012/11/121130094725.htm>: Accessed 10 November 2015.
2. Hall AH, Spoerke DG, Rumack BH. Assessing mistletoe toxicity. *Annals of Emergency Medicine*. 1986;15(11):1320-23.

# An Updated Review of the Phytochemistry and Therapeutic uses of Plants of the Genus *Aloe*

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Plants of the genus *Aloe* have perhaps the longest recorded history of medicinal usage and are amongst the most widely used plants for traditional medicinal purposes worldwide.<sup>1</sup> *Aloe vera*, *Aloe ferox*, *Aloe arborescens* and *Aloe perryi* are the best known and most widely used, but many other species are also used for their therapeutic properties. The Aloes have been used since ancient times, particularly for the treatment of microbial infections, gastrointestinal disorders and inflammatory conditions. In addition to their myriad uses in traditional therapeutics, the Aloes have also been used as components of cosmetic formulations, and in the food and beverage industries. Despite their wide acceptance, studies from different laboratories often report wide variations in the therapeutic bioactivities from within the same *Aloe* species, even when the same extraction procedures are used. Furthermore, leaves from individual *Aloe* plants within the same species may have widely varying levels of the bioactive phytochemicals. Phytochemical analyses have shown that many *Aloe* species contain various carbohydrate polymers (notably glucomannans) and a range of other low molecular weight phenolic compounds including alkaloids, anthraquinones, anthrones, benzene and furan derivatives, chromones, coumarins, flavonoids, phytosterols, pyrans and pyrones. There has been a wealth of information published about the phytochemistry and therapeutic potential of the Aloes (especially

*Aloe vera*). Much of this has been contradictory. Intra and interspecies differences in the redox state of the individual *Aloe* components and in the ratios of these components may occur between individual plants. These factors may all affect the physiological properties of *Aloe* extracts. Due to the structure and chemical nature of many of the *Aloe* phytochemicals, it is likely that many of the reported medicinal properties are due to antioxidant or prooxidant effects.<sup>2</sup> The antioxidant/prooxidant activities of many *Aloe* phytochemicals depend not only on their individual levels, but also on the ratios between the various components and their individual redox states. Therefore, discrepancies between bioactivity studies are likely when using different crude mixtures. This book chapter updates and summarises our current knowledge of the phytochemistry of the Aloes and (a) examines how their constituents may be responsible for their medicinal properties and (b) some possible reasons for the wide variations reported for their medicinal properties and (c) their therapeutic mechanisms.

1. Cock IE. The genus *Aloe*: Phytochemistry and therapeutic uses including treatments for gastrointestinal conditions and chronic inflammation. *Progress in Drug Research*. 2015;70:179-235. DOI: 10.1007/978-3-0348-0927-6\_6
2. Cock IE. Problems of reproducibility and efficacy of bioassays using crude extracts, with reference to *Aloe vera*. *Pharmacognosy Communications*. 2011;1(1):52-62. DOI: 10.5530/pc.2011.1.3